The Scottish Mathematical Council

www.scot-maths.co.uk

MATHEMATICAL CHALLENGE 2011–2012

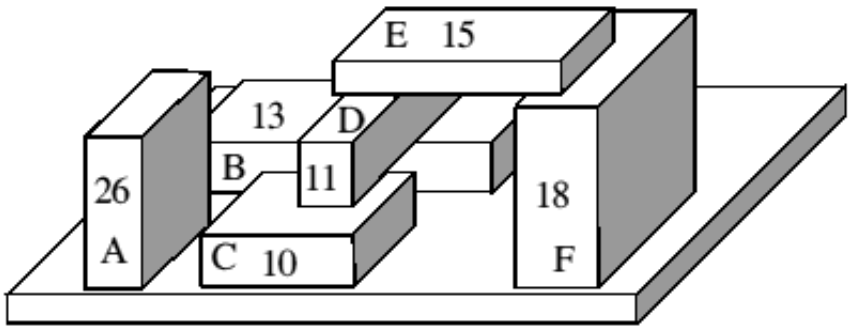
Entries must be the unaided efforts of individual pupils.
Solutions must include explanations and answers without explanation will be given no credit.
Do not feel that you must hand in answers to all the questions.

CURRENT AND RECENT SPONSORS OF MATHEMATICAL CHALLENGE ARE
The Edinburgh Mathematical Society, Professor L E Fraenkel,
The London Mathematical Society and The Scottish International Education Trust.
The Scottish Mathematical Council is indebted to the above for their generous support and gratefully acknowledges financial and other assistance from schools, universities and education authorities.
Particular thanks are due to the Universities of Aberdeen, Edinburgh, Glasgow, Heriot Watt, Stirling, Strathclyde, and to Preston Lodge High School, Bearsden Academy, Beaconhurst School and Northfield Academy.

Primary Division: Problems III

P3.1. The diagram below shows an architect's model for a new school complex. Marked on each block is the time (in months) it should take to build. The school has to be made such that no block can be started until any block on which it rests has been completed but different teams of builders were contracted to do the work so that more than one block could be built at the same time. What is the minimum construction time?

Explain your reasoning.



P3.2. A water-tank can be filled by any combination of three different taps. With the smallest tap the tank can be filled in 20 minutes. With the middle tap the tank can be filled in 12 minutes. With the largest tap the tank can be filled in 5 minutes. How long does it take to fill the tank with all three taps running?

Explain your reasoning.

P3.3. The children were playing with the bouncing balls in the playground when I arrived there. A ball reached my full height before falling back down and I am 1.6 metres tall. "Wow! That was some bounce!", I said, but the boy responded, "That was nothing – you should have seen the first bounce. That was the third bounce". Each bounce of this particular ball is 20% less than its previous bounce. What height was the first bounce?

Explain your reasoning.

END OF PROBLEM SET III

CLOSING DATE FOR RECEIPT OF SOLUTIONS :	2nd March 2012

Look on the SMC web site: www.scot-maths.co.uk for information about Mathematical Challenge.